TOWARDS STANDARDISATION OF MOBILE NETWORK OPERATOR (MNO) DATA PROCESSING FOR EUROPEAN OFFICIAL STATISTICS

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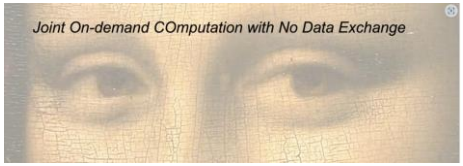
***Main goal at ESS level**: Enable the re-use of Mobile Network Operator (MNO) data for the regular production of official statistics(…)*

- *Beyond the eventual practice of experimental solutions / exercises*
- *Based on a sustainable partnership model between ESS members and industry actors (MNOs)*
- *Processed according to **standard and open methodologies** and **transparent quality criteria** defined at EU level (based on the collaboration between the ESS and the industry actors)*
- *Incorporating strong technical and organisational measures agreed at the EU level for protecting personal data and business sensitive information*
- *Combined with other (non-MNO) data for calibration/stabilisation/validation for enriching the statistical outputs obtained and improving the statistical production.*



JOCONDE (2024-2026)

Rev. Regulation (EC) No. 223/2009 on European Official Statistics (2024)

MNO-MINDS ESSnet research grant (2023-2025)

Multi-MNO project (2023-2025)

Reusing mobile network operator data for official statistics: the case for a **common methodological framework** for the European Statistical System – 2023 edition

EG B2G4S Empowering society by reusing privately-held data for official statistics — A European approach — 2022 edition

ESSnet Big Data II - WPI Mobile Networks Data | Eurostat CROS (europa.eu) (2018-2020)

ESSnet Big Data II - WPK Methodology and Quality | Eurostat CROS (europa.eu) (2018-2020)

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Goal: *Develop a complete, open end-to-end processing pipeline as a proposal for the future production of official statistics based on MNO data and demonstrate it across real-world data from multiple MNOs.*

*If successful, the proposal developed by the project may be endorsed as **ESS standard** by the relevant ESS bodies.*

Specific objectives:

- Development of an **open end-to-end methodology and quality framework** for the processing of MNO data for official statistics;
- Development of a **reference open-source software pipeline** implementing the proposed methodological framework;
- Practical **demonstration of the processing** pipeline across five MNOs in four EU countries to produce a set of experimental statistics.

Specific 'Design principles' defined in coordination with Eurostat – the EU statistical office

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Consortium leader

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Istat

Methodology and quality in official statistics

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Software code implementation

Advisory Board for the Use of MNO's Data for Official Statistics

REPUBLIC OF SLOVENIA STATISTICAL OFFICE

Statistics Poland

Individual experts

Testing MNOs

Post Luxembourg, A1, Vodafone Italy, orange, Orange Spain, Vodafone Spain

- *A **forefront partnership** setting => co-development partnership between NSIs, industry experts and data holders, plus additional expert advice from the project Advisory Board (ad-hoc project specialist external grouping of14 individual experts)*
- *Service contract financed by Eurostat, awarded following an open call for tenders, see EU Funding & Tenders Portal (europa.eu)*
- *Timeline: January 2023 – June 2025*

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- **Task 1: Website and dissemination**
- **Task 2: Scenarios, requirements, use cases, methodological framework and high-level architecture**
  - Consolidated technical documentation by end of 2024
  - Final version by end of the project
- **Task 3: Quality framework and Business Process Model**
  - Consolidated technical documentation by end of 2024
  - Final version by end of the project
- **Task 4: Open-source software implementation**
  - Release for 2 use cases by end of 2024
  - Final release for a minimum of 6 use cases by end of the project
- **Task 5: Testing and demonstration on real-world data**
  - Complete 1st test round by end of 2024
  - Complete 2nd test round by end of the project

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*Developed methodological framework viable to work for all MNOs in EU countries, tailored to the European state-of-play in mobile technology, services, usage and statistical needs**

Main characteristics:

- ⇒ *Modular, flexible and evolvable methodological workflow*
- ⇒ *Longitudinal analysis with built-in "privacy by design" elements*
- ⇒ *Incorporates advanced geolocation approaches and probabilistic reasoning from past ESS work*
- ⇒ *Underlines the multi-MNO perspective*
- ⇒ *Develops a total of 13 use cases (relevant statistical outputs from the perspective of NSIs)*
- ⇒ *Integrates a European perspective and approach (e.g. MNO vs mobile phone data, signaling data, data protection, ESS quality aspects, etc.)*

**Assuming comparable data access situation across EU countries (legal, business, data protection)*

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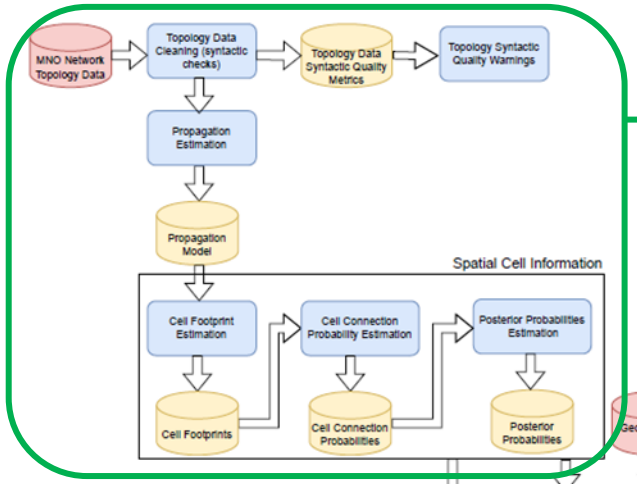
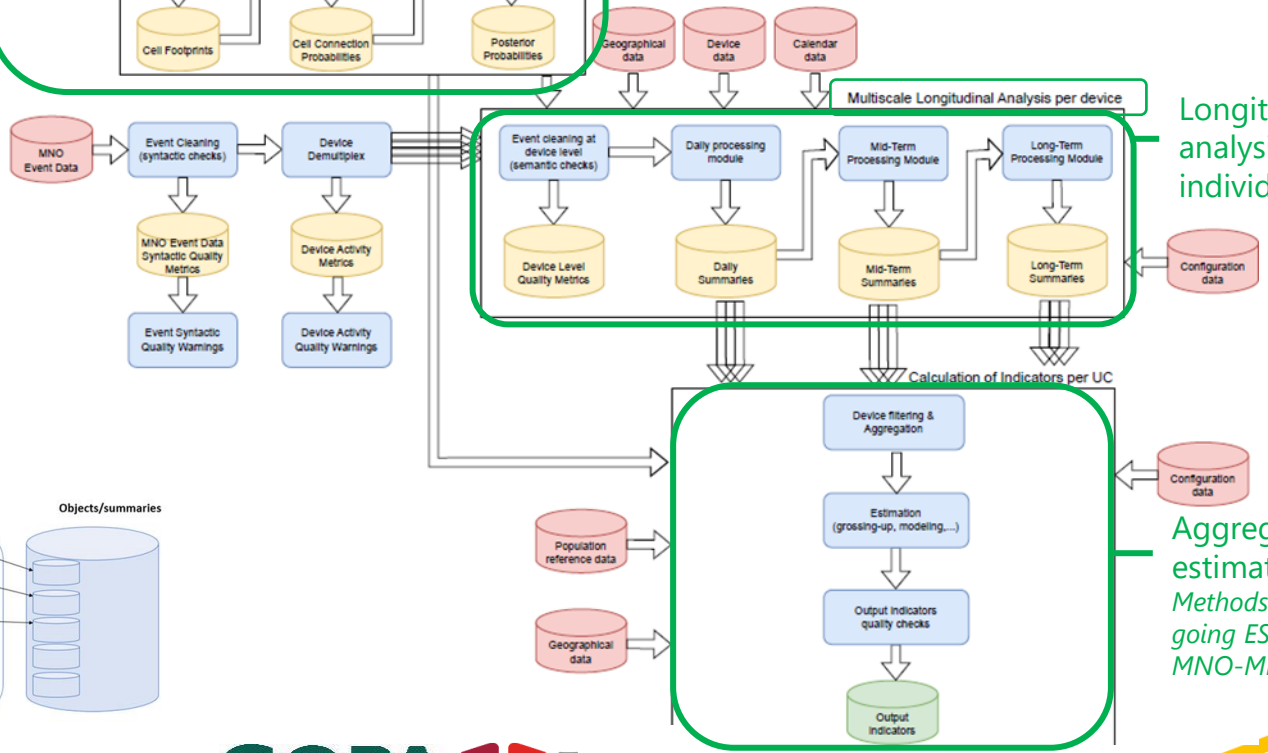


Advanced geolocation

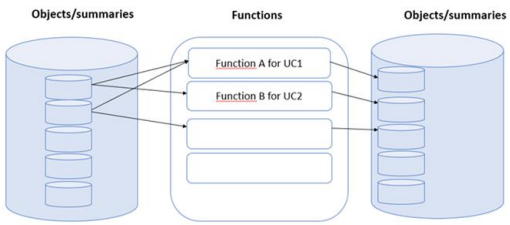
Based on past work by ESSnet BigData II - WPI



Longitudinal analysis of individual data

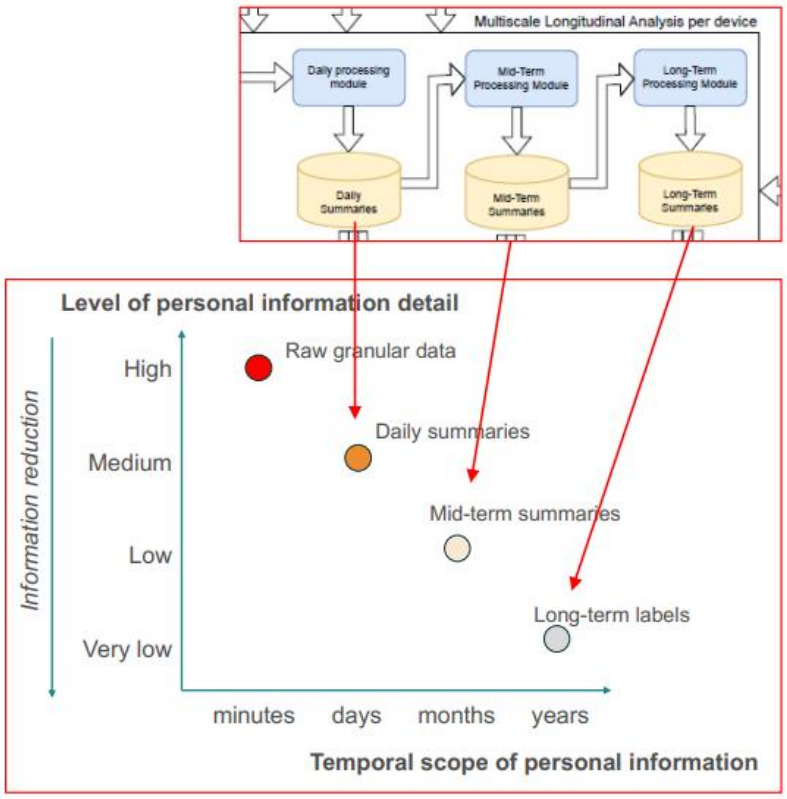
Modularity, flexibility, and evolvability:

- Data (sub)objects
- Processing (sub)modules

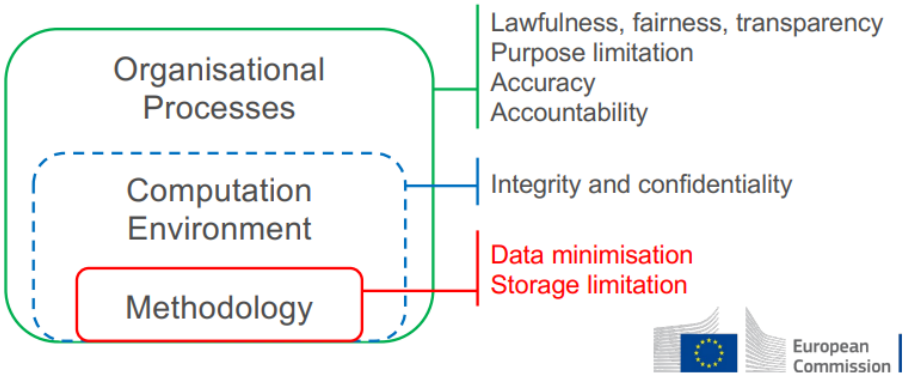


Aggregation, estimation

Methods from on-going ESSnet MNO-MINDS



- Data minimisation & Storage minimisation by *methodological design (within the longitudinal analysis module)*
- *Individual data never exported outside the safe computation environment at MNO premises*
- *Further supplementary Technical and Organisational Measures may be added (e.g. JOCONDE) preferably defined at EU level*



*credit to Eurostat
Source: [20240506_rome_AB_meeting-2021-0400_vf (europa.eu)]

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13 use cases developed from the perspective of the expected **statistical output:**

UC 1.A: Present population estimation (in a specific geographical area at a fixed moment in time)
UC 2.A: Usual environment
UC 2.B: MNO-Home location
UC 2.C: Access to services
UC 3.A: Usual mobility
UC 3.B: Commuting
UC 4: Functional urban areas and greater city
UC 5.A: Domestic touristic arrivals and nights spent
UC 5.B: Domestic same day visits
UC 5.C: Inbound tourism
UC 5.D: Outbound tourism
UC 6: Exposure to risks
UC 7: Internal migration

- ✓ (as much as possible) Follow the concepts and definitions in official statistics, but also,
- ✓ Explore new and emerging phenomena => 'variants' of potential outputs (e.g. de facto vs de jure resident population)
- ✓ Statistical outputs are extracted and analysed through the 'longitudinal observation of the MNO data' (*n.b. temporal and spatial granularity of MNO data as input*)
- ✓ Harmonised spatial grid for statistical outputs (e.g. INSPIRE spatial grid)
- ✓ Allow for parametrisation settings to cope with national/local differences (without compromising the methods' standardization and the comparability of results)

Developed (draft) common ESS quality framework and business process model for the statistical production based on MNO data*

Main characteristics:

- ⇒ *Quality aspects developed jointly with the methodology; i.e. inseparable complement to the proposal for a common ESS methodological standard for the processing of MNO data - an evolvable quality standard*
- ⇒ *Coherence with the ESS Common Quality Framework, while being specifically tailored to MNO data*
- ⇒ *Proposals for measuring and monitoring input (source data) quality and throughput quality*
- ⇒ *Addresses software quality aspects*
- ⇒ *Comprehensiveness to guarantee the quality of the organisational, technical and management processes for exploiting MNO data*
- ⇒ *Close coordination with and integration of results from other ESS related initiatives*

**Defined based on the standard methodological workflow*

For further details or if you wish to be informed on the results of our work, please:

Follow our website: Multi-MNO project | Eurostat CROS (europa.eu)

and/or

Contact: Florabela Carausu / Florabela.Carausu@gopa.de
Project Manager, Service Contract Eurostat ref. 2021.0400, Multi-MNO

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Thank you for your attention!

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